

WHAT IS CLAIMED IS:

1. An amplifier, comprising:  
an input stage amplifier coupled to an output node;  
an output stage comprising at least two switching  
5 elements and coupled to the output node; and

a control circuit coupled to the output stage, the  
control circuit operable to produce a tri-state output of  
the output stage in response to a sensed value  
proportional to an amount of current that flows to the  
10 output node.

2. The amplifier of claim 1, wherein the amplifier  
comprises an audio amplifier.

3. The amplifier of claim 1, wherein the input  
15 stage amplifier comprises a class AB amplifier.

4. The amplifier of claim 1, further comprising a  
threshold circuit operable to measure the current and to  
20 generate the sensed value.

5. The amplifier of claim 1, wherein the control  
circuit comprises:

a first portion operable to control the output stage  
25 when the current flows from the input stage to the output  
node; and

a second portion operable to control the output  
stage when the current flows from the output node to the  
input stage.

6. The amplifier of claim 1, wherein the control circuit is further operable to:

activate a first switching element of the output stage until the current reaches a second threshold after exceeding a first threshold;

activate a second switching element of the output stage until the current reaches a fourth threshold after exceeding a third threshold; and

deactivate the first switching element until the current exceeds the first threshold and deactivating the second switching element until the current exceeds the third threshold.

7. A control circuit, comprising:

a first portion operable to activate and deactivate a first switching element of an output stage in response to a sensed value proportional to a current; and

a second portion coupled to the first portion and operable to activate and deactivate a second switching element of the output stage in response to the sensed value, and wherein the activation and deactivation of the first and second switching elements produce a tri-state output of the output stage.

8. The control circuit of claim 7, wherein the current flows from an input stage amplifier coupled to the first and second stages to an output node coupled to the output stage.

9. The control circuit of claim 7, wherein the first portion and the second portion comprise at least one comparator responsive to the sensed value.

5           10. The control circuit of claim 7, wherein the control circuit is operable to deactivate both of the switching elements when the sensed value is approximately zero.

10           11. The control circuit of claim 8, wherein:  
the first switching element is activated until the current reaches a second threshold after exceeding a first threshold, the second switching element being activated until the current reaches a fourth threshold after exceeding a third threshold, the first switching element being deactivated until the current exceeds the first threshold, and the second switching element being deactivated until the current exceeds the third threshold.

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12. The control circuit of claim 11, wherein the second threshold is the same as the fourth threshold.

13. A method for improving amplifier efficiency, comprising:

measuring a sensed value proportional to a current  
5 flowing from an input stage amplifier to an output load coupled to an output stage of an amplifier, the output stage comprising at least two switching elements; and

producing a tri-state output of the output stage of the amplifier using a control circuit in response to the  
10 sensed value.

14. The method of claim 13, wherein the sensed value comprises a voltage.

15 15. The method of claim 13, wherein the input stage comprises a class AB input stage.

16. The method of claim 13, wherein the control circuit comprises at least one comparator responsive to  
20 the sensed value and operable to control at least a first switching element of the output stage.

17. The method of claim 13, wherein producing a tri-state output comprises:

5       activating a first switching element of the output stage until the current reaches a second threshold after exceeding a first threshold;

      activating a second switching element of the output stage until the current reaches a fourth threshold after exceeding a third threshold; and

10       deactivating the first switching element until the current exceeds the first threshold and deactivating the second switching element until the current exceeds the third threshold.

15       18. The method of claim 17, wherein the second threshold is the same as the fourth threshold.

20       19. The method of claim 17, wherein each of the thresholds comprise a voltage proportional to the sensed value.

25       20. The method of claim 17, wherein the first switching element is activated and deactivated by at least one comparator circuit, and the second switching element is activated and deactivated by at least one additional comparator circuit.